Department for International Development

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Can interventions in agriculture improve nutrition?

EVIDENCE BRIEF

This brief summarises evidence from a DFID Evidence Paper *Can agriculture interventions promote nutrition?* (2014)

Background

There is a growing interest in identifying whether interventions in agriculture improve nutrition outcomes. Agriculture may improve nutrition either directly, for example when farming households increase the production and consumption of nutritionally diverse diets, or indirectly when household and national income increases through the sale of agricultural products.

Evidence Paper

The paper provides a critical review of the strength and quality of evidence linking interventions in agriculture with nutrition outcomes. Five interventions are reviewed: home gardening, aquaculture, livestock production, cash-cropping and biofortified crops. The primary nutrition outcomes of interest were biochemical measures of micronutrient status and anthropometric measures of childhood growth.

How to use this brief

This brief provides an overview of the studies included in the full Evidence Paper to assist policy-makers and researchers in assessing the evidence. It summarises findings and provides citations to the scientific literature.

Methods

A structured search of the literature was undertaken. Studies of the impact of agricultural interventions on nutrition, conducted in low- or middle-income countries and published in English in peer-reviewed journals were identified and screened to meet pre-defined inclusion criteria. The remaining studies (38 in 40 reports) were systematically synthesised.

Key findings

- Evidence base: Relatively small with methodological weaknesses that reduce ability to identify the impacts of several interventions.
- Home gardens: Inconsistent effects on micronutrient status and childhood growth. Consistent evidence that fruit &/or vegetable production and consumption increases, including intake of vitamin A rich foods.
- Aquaculture: Very small evidence base with inconsistent findings. Some evidence that fish consumption and income in fish-farming households increases.
- Livestock: No data on impact on micronutrient status; inconsistent effects on childhood growth. Milk consumption increases in dairy interventions. Some evidence that livestock production/ ownership and household income increase.
- Cash-cropping: No data on impact on micronutrient status; inconsistent effects on physical growth. Moderate evidence that household income increases.
- Biofortified crops: Consistent evidence that micronutrient status of children improves; mixed evidence for women. Moderate evidence that physical growth improves.

Research gaps

More high-quality research is urgently needed to identify robustly whether intervention in agriculture can improve nutrition outcomes.

Studies are also needed that:

- include data on cost-effectiveness
- directly compare different agriculture interventions
- investigate the sustainability of the agricultural interventions and their effects
- report qualitative data on the barriers and incentives for adoption of interventions and understand pathways of impact.

A recent DFID-funded report identified that there are significant research efforts currently underway on this topic and the evidence base is expanding rapidly[a].

Summary map of evidence

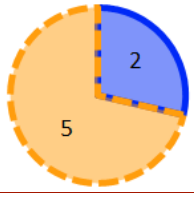
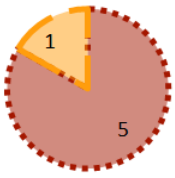
The summary map below outlines the quantity of studies included in the Evidence Paper according to agricultural intervention, quality of study and type of study. Some studies looked at more than one intervention. Of the 38 studies, only two were found to be of high quality. Quality was assessed against definitions set out in the DFID note *Assessing the strength of evidence*.

Experimental research designs include randomised controlled trials that randomly assign individuals, households or communities to receive, or not receive, an intervention. Quasi-experimental studies do not assign subjects at random to either group. In observational studies the effect of an intervention is observed in a population over time.

Research designs

- Experimental
- Observational
- Quasi-experimental

Summary of included studies by intervention, study quality and research design

Intervention	High quality	Moderate quality	Low quality	Total studies
Home gardening	Total = 1 	Total = 7 	Total = 7 	**15** Sub-Saharan Africa: 7 Asia: 8
Aquaculture	Total = 0	Total = 4 	Total = 1 	**5** Sub-Saharan Africa: 1 Asia: 4
Livestock production	Total = 0	Total = 1 	Total = 5 	**6** Sub-Saharan Africa: 3 Asia: 3
Cash-cropping	Total = 0	Total = 4 	Total = 4 	**8** Sub-Saharan Africa: 5 Asia: 2 Latin America: 1
Biofortified crops	Total = 1 	Total = 6 	Total = 1 	**8** Sub-Saharan Africa: 6 Asia: 2

Outline of evidence

This section outlines the key findings from the available body of evidence. The full Evidence Paper provides more detail, further findings on primary and secondary outcomes, and the findings on other outcomes.

	Primary outcomes		Secondary outcomes
	Biochemical measures of micronutrient status	**Anthropometric measures of physical growth**	
Home gardening	• Inconsistent effect on vitamin A status across 5 studies[5,8/9,24,36,37] • Positive impact on haemoglobin in women in 1 study[34], but no impact in another[26] • Positive impact on vitamin E in children in 1 study[37].	• Inconsistent findings. No impact on height-for-age, weight-for-age and weight-for-height in children in 4 studies[8/9,34,36,37], while 3 studies record positive associations in some measures[7,22,26].	• Positive association with increased production and consumption of fruit and/or vegetables[3,7,8/9,12,19,23,24,28,34,37]) • An association with an increase in intake of vitamin A rich foods[5,7,8/9,10,12,19,24,26,28,34]. Small and inconsistent evidence on other nutrients[7,8/9,26,36,37]. • Inconsistent results in relation to morbidity[6,28,34].
Aquaculture	• Reduction in anaemia for early adopters of individual fish ponds but not for group fish ponds in 1 study[26].	• Inconsistent findings. Improved weight-for-age but not weight-for-height or height-for-age between 6-50 months of age in fish farming households in 1 study[1], but the results were mixed in another study[26].	• No studies report data on dietary diversity or morbidity • Increased consumption of fish in 2 studies [6/7,31]; 1 study found no increased fish consumption[35] • Positive impact of individual pond fish farming on nutrient intake but a negative impact from group ponds in 1 study[26]. • Positive impact on household income in 2 studies[26,31]
Livestock	No evidence for effect on nutritional status in women or children (6 months to 7 years).		• 4 studies did not find an impact on livestock consumption[20,33,34,36], though 2 studies found higher milk consumption[14,40]. • Higher incomes as a result of the intervention[14,20,33,40]. • 1 study reports lower prevalence of fever but not of diarrhoea and measles[34].
Cash-cropping	No studies found.	• 4 studies report no difference[11,18,27,38] • 2 studies report improved weight-for-age and reduction in stunting but neither study could show this was as a direct result of cash-cropping[13,17]. • 1 study reported mixed results[32].	• No studies report on consumption or dietary diversity • No association between cash-cropping and increased energy intake[13,21,32]. • Higher incomes among households involved in cash cropping[11,13,18,21,27,32,38]. • 3 studies suggest that incremental increases in income from cash crops are not spent on food[18,21,38]. • 1 study found a decrease in intestinal worm infections[13].
Biofortified crops	• Increased vitamin A and iron/zinc status of children (22 months – 5 years)[16,25,29/30].	• Quality protein maize has a positive impact on weight and height growth where there is mild/moderate malnutrition at baseline and maize-based diets[2,39].	• No studies report on production, dietary diversity, household income/expenditure or morbidity. • Increased access to orange-fleshed sweet potato (OFSP) resulted in increased consumption of OFSP and greater intake of pro-vitamin A[15,16,29].

This evidence paper has been funded by the Department for International Development. However, the views expressed do not necessarily reflect the department's official policies.

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Included studies (H = high quality study; M = moderate quality study; L = low quality study, as assessed by the authors of the Evidence Paper)

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